PATENT SPECIFICATION (11) 1 395 632

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(21) Application No. 28368/72 (22) Filed 16 June 1972
(31) Convention Application No. 59 460/71 (32) Filed 5 Aug. 1971 in
(33) Japan (JA)
(44) Complete Specification published 29 May 1975
(51) INT. CL.[2] B23K 9/20
(52) Index at acceptance
B3R 2A


# (54) ARC WELDING STUDS

(71) I, ISAO SUEMATSU, a Japanese citizen, of Sanyu Kuzuhara-Danchi, 1301-11, Oaza-Kuzuhara, Korura-ku, Kitakyusho City, Fukuoka Prefecture, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

The present invention relates to arc welding studs.

As a rule, in conventional arc stud welding, a stud made of brass or copper is first pressed against the steel base metal. Next, the stud is slightly lifted up to form a narrow space between the bottom of the stud and the base metal, and a strong electric current is applied. The bottom surface of the stud is fused by the heat of the arc generated between the bottom of the stud and the base metal, the fused material fills the space between them, and the stud is pressed onto the base metal again to weld the two together.

However, since in conventional studs, their bottom surfaces are merely flat and have only one projection at the centre of the flat surface, the arc does not disperse equally in all directions over the bottom surface because of the "Magnetic-blowout" phenomenon presented at the time of electric discharge. This causes uneven fusing or distorted welding, so it is necessary to use supplementary materials, e.g. a welding rod or flux, in order to prevent the conventional stud from being poorly welded to the base metal, and consequently the operation has to be carried out by expert artisans.

According to the invention there is provided an arc welding stud comprising a body, the welding end surface of which is provided with a plurality of projections made of a heat-fusible electrically conducting material, one projection being a centre projection located at the centre point of the end surface and the other projections being radial, symmetrically located about and respectively attached to the centre projection.

In accordance with the present invention, efficient and perfect welding can be easily effected in a short time while avoiding the defects heretofore commonly resulting from the conventional studs.

The invention will be further described with reference to the accompanying drawings, which illustrate apparatus constituting various embodiments of the invention, which are given by way of example only and not by way of limitation.

In the drawings:—

Figure 1 is a front elevation showing a first embodiment of the invention;

Figure 2 is a bottom plan view of the embodiment shown in Figure 1;

Figure 3 is a vertical section taken along the line II-II of Figure 1;

Figure 4 is a front elevation showing the second embodiment of the invention;

Figure 5 is a bottom plan view of the embodiment showing in Figure 4;

Figure 6 is a perspective view of the first embodiment in Figure 1-3;

Figure 7 is a perspective view of the second embodiment in Figure 4.

The first embodiment, in the form of a stud bolt, will now be described in detail. In this embodiment, a cylindrical body 1 with a spiral groove is provided with a projection 2 at the centre of the welding end surface of the stud body, which projection is made of some fusible material, which may be the same as that of the stud body or different from it, and a suitable number of radial projections

3,3′, . . . of the same material as the projection 2 extend radially therefrom.

Referring now to Figure 1, a welding machine 4 and base metal 5 are schematically indicated by chain-dotted lines.

In the present invention, first of all the stud body 1 is held by the welding machine 4. When the electric current, which may be direct or alternating is turned on and the welding end surface of the stud is simultaneously pressed onto the base metal 5, the projection 2 at the centre of the end surface of the stud fuses rapidly as it is heated by the Joule effect and a small space occurs between the base of the stud 1 and the surface of the base metal 5. Next, an arc generated across said small space and the arc discharge is dispersed in all directions along the radial projections 3,3′ . . . on the end surface of the stud, so that the fused material fills the opening between the stud and the base metal, welding them to each other.

It will be noted from Fig. 2 that the radial projections in this first embodiment are thicker near the centre of the end surface and thinner near the periphery of the end surface.

The uneven fusion or distorted welding which has often occurred when using conventional studs is obviated by the radial projections extending from the central projection on the base of the stud. Additional benefits resulting from the use of the stud according to the present invention are: that there is no need to use supplementary material such as a welding rod or flux and also no need to advance and retract the welding machine. Therefore the welding work is executed with much more efficiency in a shorter time.

In the second embodiment of the invention, shown in Figures 4, 5 and 7, a stud for arc welding comprises a smooth cylindrical body 1 with an end surface extending beyond said cylindrical body and having a projection 2 at the centre of said surface. In addition radial projections 3,3 run from the centre projection 2 towards the outer margin of said surface. All projections are made of a heat fusible material.

With the stud of this embodiment, similar effects can be obtained as with the first embodiment.

WHAT I CLAIM IS:—

1. An arc welding stud comprising a body, the welding end surface of which is provided with a plurality of projections made of a heat-fusible electrically conducting material, one projection being a centre projection located at the centre point of the end surface and the other projections being radial, symmetrically located about and respectively attached to the centre projection.

2. An arc welding stud as claimed in Claim 1, in which said radial projections are thicker near the centre point of said end surface and thinner near the periphery of said end surface.

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Agents for the Applicant(s).

Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1975.
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

1395632 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
**Sheet 1**

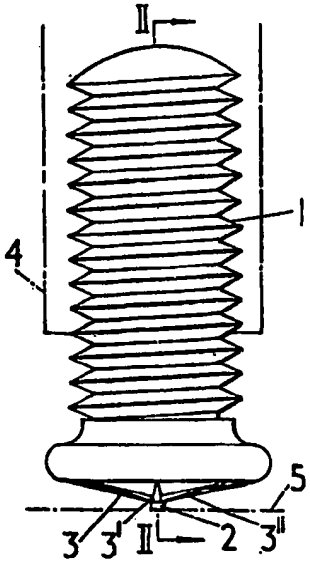


FIG.1.

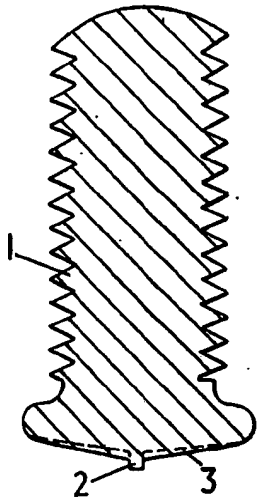


FIG.3.

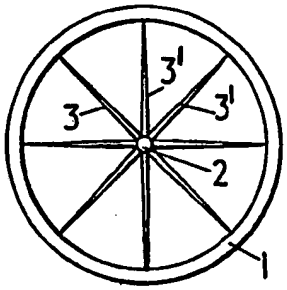


FIG.2.

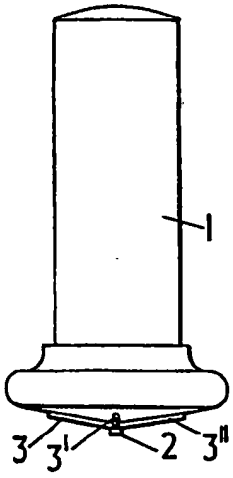


FIG.4.

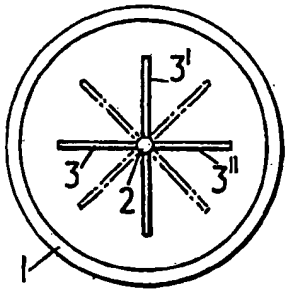


FIG.5.

1395632 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 2

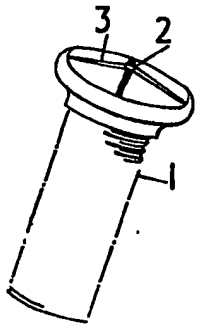


FIG.6.

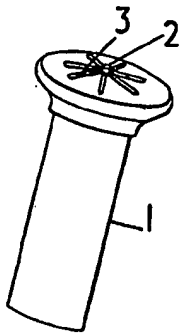


FIG.7.